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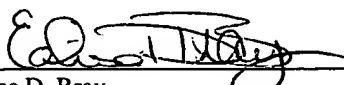
Appln No. 09/963,872
Amdt date June 19, 2003
Reply to Office action of March 19, 2003



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#9
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Appl No. : 09/963,872
Applicant : Ho-Jin Kweon, et al.
Filed : September 25, 2001
Title : METHOD OF PREPARING POSITIVE ACTIVE MATERIAL FOR RECHARGEABLE LITHIUM BATTERIES

TC/A.U. : 1762
Examiner : Brian K. Talbot

Docket No. : 47173/DBP/Y35

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RESPONSE TO OFFICE ACTION

In response to the Office action dated March 19, 2003, Applicant submits the following remarks. Claims 1 to 29 are pending, with claims 1, 12 and 22 being independent. The claims are all directed to a method of preparing a positive active material for a rechargeable lithium battery. Claim 1 recites that the method comprises (a) introducing into a mixer a lithiated compound and either an organic solution including a coating-element source or an aqueous solution including a coating element source; (b) coating the lithiated compound with the organic solution or the aqueous solution, while increasing the ambient temperature and mixing; and (c) heat-treating the coated lithiated compound to form a surface-treatment layer on the surface of the lithiated compound. Claim 12 is similar to claim 1, but recites specific lithiated compounds. Claim 22 is similar to claim 12, but further defines the organic solution and oxide surface-treated layer.

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The Examiner rejected claims 1 to 29 under 35 U.S.C. § 103(a) as allegedly unpatentable over Applicant's admitted state of the art (specification, pages 1 to 2 and Figure 1) in combination with Dahn et al. (U.S. Patent No. 4,959,282). Applicant respectfully traverses this rejection.

The Examiner states that Applicant's admitted state of the art teaches preparing a coating solution of a lithium compound and an aluminum isopropoxide solution, mixing, removing from the mixer and air drying, heating and then sieving to achieve a coating of an aluminum oxide on the lithium compound. The Examiner acknowledges that Applicant's admitted state of the art fails to teach mixing and drying the lithium compound coated with the aluminum isopropoxide in the mixer.

The Examiner relies on Dahn to remedy this deficiency, namely, to teach the step of drying and mixing in a single vessel. Dahn is directed to a method of making a cathode active material by providing a substantially-dry intermediate material comprising Li and gamma-phase MnO_2 in admixture.

Applicant submits herewith a Declaration by Ho-Jim Kweon pursuant to 37 C.F.R. § 1.132. In the Declaration, Dr. Kweon explains that he prepared a cell containing a positive active material prepared in accordance with the method of the invention, as described in Example 1 of the specification. He also prepared a cell containing a positive active material in accordance with Applicant's admitted state of the art, as described in Comparative Example 1 of the specification. The positive active materials made in accordance with Example 1 and Comparative Example 1 both started with 5 g of Al-isopropoxide powder dissolved in 95 g of ethanol to prepare 5% Al-isopropoxide solution. In the method of Example 1, the mixing and drying steps were performed together in a mixer, whereas in the method of Comparative Example 1, the mixing and drying steps were performed separately in different vessels.

As explained in the Declaration, the average discharge voltage of the cell containing the positive active material made in accordance with inventive Example 1 is substantially higher than that containing the positive active material according to non-inventive Comparative Example 1. Moreover, the cycle life of the cell including the positive active material of inventive Example 1 is improved substantially over the cell containing the positive active material of non-inventive Comparative Example 1. In Dr. Kweon's opinion as one familiar with lithium secondary batteries, the substantially-improved results of the cell containing the positive active material according to the

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invention compared to the cell containing the positive active material according to Comparative Example 1 are unexpected.

In view of the evidence of unexpected superior results produced by a cell containing a positive active material produced by the method of the present invention, Applicant respectfully submits that any *prima facie* case of obviousness that may have been established by the Examiner is overcome. Applicant therefore respectfully requests that the rejection under section 103(a) be withdrawn.

The Examiner provisionally rejected claims 1 to 29 under the judicially created doctrine of obviousness-type double patenting as allegedly unpatentable over claims 11 to 24 of copending Application No. 09/897,445 in view of Yahagi et al. (U.S. Patent No. 5,939,043). The Examiner states that the only difference between the claimed inventions is that the present claims require coating and drying the lithium compound with an organic solution in a mixer. The Examiner relies on Yahagi to teach forming a lithium compound by mixing the powders in a ball mixture to form the compound.

Claim 11 of copending Application No. 09/897,445 recites a method of preparing a positive active material for a rechargeable lithium battery comprising coating at least one lithiated compound with an organic solution of coating material source or an aqueous solution of coating material source to produce a coated compound; and drying the coated compound. Claim 11 does not teach or suggest the step of heat-treating the coated lithiated compound to form a surface-treatment layer on the surface of the lithiated compound, as recited in the present claims. None of the other claims of copending Application No. 09/897,445 include this teaching. Yahagi similarly fails to teach or suggest this limitation, as Yahagi disclosed mixing powders, not mixing a lithiated compound with a solution, and thus any heating disclosed in Yahagi does not constitute heat-treating to form a surface-treatment layer on the surface of the lithiated compound. The heating taught by Yahagi is instead a calcination step. Applicant therefore respectfully submits that the combination of the claims of copending Application No. 09/897,445 and Yahagi does not teach or suggest the claimed invention and requests that the provisional obviousness-type double patenting rejection be withdrawn.

In view of the foregoing remarks, Applicant respectfully submits that pending claims 1 to 29 are in condition for allowance, and a timely indication of allowance is respectfully requested. If

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there are any remaining issues that can be addressed by telephone, Applicant invites the Examiner to contact the undersigned at the number indicated below.

Respectfully submitted,

CHRISTIE, PARKER & HALE, LLP

By 

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KMO/edb
Enclosure: Rule 132 Declaration
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